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(54) Title: PROCESS OF TREATING A CARPET WITH A COMPOSITION COMPRISING A NON IRRITANT SURFACTANT

(57) Abstract: The present invention relates to a process of treating a carpet comprising the application of a liquid composition onto said carpet using an electrical spraying device wherein said composition comprises a nonirritating anionic surfactant rated nonirritating to mucous membranes as measured at a 5% active surfactant solution using the Draize test method. The process according to the present invention provides a mucous membrane non irritation benefit.

PROCESS OF TREATING A CARPET WITH A COMPOSITION COMPRISING A NON IRRITANT SURFACTANT

Technical Field

The present invention relates to a process of treating a carpet using a liquid composition. More particularly, the present invention relates to a process of treating a carpet comprising the application of a liquid composition onto said carpet using an electrical spraying device whereby said composition provides a mucous membranes non irritation benefit.

Background of the Invention

Carpets produced from synthetic or natural fibers and mixtures thereof are commonly used in residential and commercial applications as a floor covering. Various types of fibers can be used in making carpets such as polyamide fibers, polyester fibers as well as wool, cotton or even silk in the case of rugs.

However, carpets irrespective of whether they are made from natural or synthetic fibers are all prone to soiling and staining when contacted with many household items. Food, grease, oils, beverages in particular such as coffee, tea and soft drinks especially those containing acidic dyes can cause unsightly, often dark stains on carpets. Also fibers may become soiled as a result of dirt particles, clay, dust, i.e., particulate soils in general, coming into contact with and adhering to the fibers of the carpet. These latter soils often appear in the form of a diffuse layer of soils rather than in the form of spots and tend to accumulate particularly in the so called "high traffic areas", such as near doors, as a result of intensive use of the carpets in such areas.

Liquid compositions for treating carpets are already known in the art. For example as disclosed in WO 95/04127. To improve the cleaning performance of said liquid compositions, surfactants are added to carpet cleaning compositions, as for example disclosed in EP-A-0 794 244.

Liquid compositions for treating carpets may by delivered onto a carpet in a variety of ways using, e.g., manually operated spraying devices such as hand activated trigger spray devices, pressurised aerosol spray dispensers such as pressurised aerosol cans, electrically operated spraying devices and the like. Large surfaces, such as carpets, are however difficult to treat with manually operated spraying devices or pressurised aerosol spray dispensers. The large surface area to be treated demands the application of a high amount of the liquid composition. Pressurised aerosol spray dispensers carry only a limited amount of product and show negative environmental effects. Manually operated spraying devices require repeated manual action of the device to apply the composition to the large surface. This is laborious for the user and results in an uneven distribution of the liquid composition over the treated surface. Therefore, electrically operated spraying devices are a preferred application form of liquid carpet treating compositions. Electrically operated spraying devices for use in carpet treating applications are known in the art, as for example, disclosed in pending patent application PCT/US99/07347.

However, liquid carpet treating compositions comprising a surfactant applied onto a carpet using an electrically operated spraying device can cause irritation of the mucous membranes of the user of said spraying device or other persons standing close by to where the composition is sprayed onto the carpet. During the application of the liquid composition, the electrically operated spraying device forms a fine spray of droplets of said composition. This fine spray of droplets comprises droplets that are small enough to form an aerosol or a mist of droplets. This aerosol is at least partially suspended in the air for a limited period of time and thus may be inhaled by the user or those in close proximity. Where the composition inhaled comprises a surfactant, it has been found that such compositions may cause irritation of mucous membranes, for example in the nose, mouth, throat or eyes.

Thus, the objective of the present invention is to provide a process of treating a carpet comprising the application of a liquid composition onto the carpet using an electrical spraying device whereby the user or those in close proximity are not affected by irritation of mucous membranes.

Furthermore, it is an objective of the present invention to provide a process of treating a carpet which provides excellent overall cleaning performance on various types of stains including particulate stains, greasy stains, bleachable stains and/or enzymatic stains.

It has now been found that the above objectives can be met by a process of treating a carpet according to the present invention.

An advantage of the process of treating carpets according to the present invention is that said process provides a safe, easy and fast way for the user to clean a carpet, whilst also providing excellent overall cleaning performance. More advantageously, the process of treating carpets according to the present invention provides excellent cleaning performance, when both used to clean the whole carpet or localized carpet stains.

Advantageously, excellent cleaning performance is obtained on different types of stains and soils, including enzymatic stains as well as particulate stains and/or greasy stains, especially in highly soiled, so called "high traffic areas".

A further advantage of the present invention is that the process of treating carpets herein is applicable to all carpet types, especially delicate natural fibers. The present invention is also suitable to be used to clean hard wearing textiles and fabrics, e.g., upholstery, rugs, curtains.

Yet another advantage of the process of treating carpets and of the compositions of the present invention is that they may be applied directly onto the carpet without causing damage. In particular, the compositions used in the present

process are safe to all known carpet dyes, even well known particularly sensitive natural dyes.

Background art

Certain surfactants are known to have a low skin, eye and/or mucous membrane irritation benefit. For example, EP-A-0 396 340, JP-A-07197079 and GB 2,236,321 disclose compositions comprising sulfosuccinate surfactants wherein said compositions show a low skin, eye and/or mucous membrane irritation benefit. However, no spraying applications are disclosed.

DE-OS-21 16 147 discloses a sprayable carpet cleaning shampoo comprising a specific sulfosuccinamate surfactant, a sodium lauryl sulfate and a specific sulfosuccinate surfactant. Furthermore, said carpet cleaning shampoo provides a mucous membrane non irritation benefit due to the presence of the surfactant system. However, carpet cleaning compositions being applied onto the carpet using an electrical spraying device are not disclosed.

Summary of the Invention

The present invention encompasses a process of treating a carpet comprising the application of a liquid composition onto said carpet using an electrical spraying device wherein said composition comprises a nonirritating anionic surfactant rated nonirritating to mucous membranes as measured at a 5% active surfactant solution using the Draize test method.

In a preferred embodiment said composition further comprises a peroxygen bleach.

Detailed Description of the Invention

Process of treating a carpet

The present invention encompasses a process of treating a carpet comprising the application of a liquid composition onto said carpet using an electrical spraying device wherein said composition comprises a nonirritating anionic surfactant as described herein.

In a preferred embodiment of the present application, said process comprises the steps of applying said composition to the surface of the carpet and leaving said composition to substantially dry on the carpet. More preferably said process of treating a carpet further comprises the step of removing said composition, even more preferably said process of treating a carpet further comprises the step of removing said composition in combination with soil particles.

In another embodiment of the present application, said process comprises the steps of applying said composition to parts, preferably heavily soiled parts, of the carpet, mechanically agitating the composition with an implement into the soiled parts of the carpet layer and leaving said composition to substantially dry on the carpet. More preferably said process of treating a carpet further comprises the step of removing said composition, even more preferably said process of treating a carpet further comprises the step of removing said composition in combination with soil particles. Any number of implements may be used to provide said mechanical agitation, including brushes, paper towels, a human finger and the like. Said mechanical agitation allows the liquid composition to better penetrate into the carpet fibers and thus improves the chemical cleaning action of said composition. In addition, said contact loosens the dirt particles forming the stain.

In the process according to the present invention, the composition is applied onto the carpet using an electrically operated spraying device. Said spraying device is preferably a container that has at least one aperture through which the composition is dispensed to produce a spray of droplets.

Such an electrically operated spraying devices may comprise a means for delivering the composition by means of a pump ("pump spray dispenser"). Said electrically operated spraying devices are particularly preferable if a large area is to be treated and/or if a high amount of product has to be applied onto a heavily stained area ("spot") of the carpet as they facilitate the ease of use by the consumer. Said electrically operated spraying devices ensure uniform coverage of the area to be treated.

A preferred electrically operated spraying device herein is a container wherein the means for delivering the composition comprises an electrically driven pump and a spray arm. Said spray arm is either extended or extendible and has at least one aperture so that in operation, the composition is pumped by said electrically driven pump from the container, through the spray arm to the aperture from which it is dispensed. It is preferred that the spray arm communicates with the container by means of a flexible connector. The spray arm may have at least one aperture located along its length. The spray arm makes it easier to control where the composition is sprayed, thereby increasing the accuracy with which the composition is applied. The electrically driven pump may be, for example, a gear pump, an impeller pump, a piston pump, a screw pump, a peristaltic pump, a diaphragm pump, or any other miniature pump. In a highly preferred embodiment the electrically driven pump for use herein is a gear pump with a typical speed between 6000 rpm and 12000 rpm. The electrically driven pump is driven by a means which typically produces a torque of between 1 and 20 mN.m such as an electric motor. The electric motor must in turn be provided with a power source. The power source may be either mains electricity (optionally via transformer), or it may be a throw-away battery or rechargeable battery. The spray arm may be rigidly extended. However such a spray arm can be difficult to store, and the spray arm is preferably extensible either by means of telescopic or foldable configuration.

In a highly preferred embodiment, the composition is applied onto the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, preferably less than 1000 microns, more preferably of less than 750 microns, even more preferably less than 500 microns, and most preferably from 350 microns to 10 microns.

By "mean diameter D(v,0.9) of less than 1500 microns" for a droplet size distribution it is meant that 90% of the spray of droplets dispensed (expressed in volume unit) has a droplet diameter of less than 1500 microns. For instance, a D(v,0.9) of less than 1500 microns indicates that 90% of the total sprayed volume is dispensed with droplets whose diameter is less than 1500 microns.

The particle size distribution of a spray of droplets can be determined by following the procedure detailed herebelow:

A suitable test equipment is the Malvern Mastersizer S LongBed® with 1000 mm lens and a maximum particle size range of 3475 microns. The Malvern Mastersizer S LongBed® provides a 21 cm opening (between its lenses) to accommodate spray flow. In all readings at the Malvern®, the lens surface must remain free of spray contamination. In the present setup procedure, the distance from the aperture of the spray dispenser to the laser was fixed at 8 cm, this to minimize lens contamination. At 8 cm distance, the spray was directed to the laser beam to place the laser center to the spray cone. At least three readings have to be made for each composition sprayed to determine the particle size distribution of the spray of droplets. The electrically operated spraying devices to be used in the test according to the present invention is preferably a battery-operated system. If such a battery-operated system is used, a "Full charge test" is being performed. By "Full charge test" it is meant herein, that the current was held consistent by connecting the battery-operated spray dispenser to a 3.9 voltage direct current (vdc) from an external power supply, this ensures a constant spray force.

Any container adapted to deliver a spray of droplets as defined herein is suitable for use herein. Several modifications can be made to the conventional, single aperture, spray head to ensure that a spray of such droplets as required herein is formed.

The amount of the compositions for the treating of carpets according to the present invention applied will depend on the severity of the stain or soil. In the case of stubborn stains more than one application may be required to ensure complete removal of the stain.

The area to be treated by applying the compositions according to the present invention may be of any size. Indeed, parts of the carpets, a complete section and/or the whole carpet may be treated with the composition for treating of a carpet according to the present invention.

In a preferred embodiment, the composition applied to the carpet is left to substantially dry. Typically, the composition is left to dry on the carpet for less than 2 hours, preferably less than 1 hour, more preferably less than 40 minutes, even more preferably from 1 to 30 minutes and most preferably from 1 to 20 minutes.

Preferably the step of leaving the composition to dry onto the carpet (drying step) can either be an "active drying step" or a "passive drying step". By "active drying step" it is meant herein, performing an additional action to facilitate the evaporation of the volatile ingredients of the liquid composition as disclosed herein, preferably by heating the carpet and/or the liquid composition applied thereon, preferably heating by means of application of hot air, infrared radiation and the like. By "passive drying step" it is meant herein, evaporation of the volatile ingredients of the liquid composition as disclosed herein without performing further action.

By "substantially dry" it is meant herein the stage where at least 40%, preferably at least 60% of the initial amount of composition dispensed onto the carpet is lost due to evaporation.

The step of leaving the composition to dry on the carpet is of course performed under "normal temperature" and "normal humidity conditions". By "normal temperature conditions" it is meant herein, from 15° C to 25° C, preferably from 20° C to 25° C. By "normal humidity conditions" it is meant herein, from 40 %RH (%-relative humidity) to 80 %RH, preferably from 50 %RH to 65 %RH.

Indeed, said composition may be left to substantially dry until said composition combined with dirt forms substantially dry residues. Preferably, said composition more preferably said substantially dry residues, are then removed from the carpet. Even more preferably said substantially dry residues are removed mechanically, as e.g., by brushing, sweeping beating, and/or by vacuum cleaning. This may be carried out with the help of any commercially available vacuum cleaner like for instance a standard Hoover® 1300W vacuuming machine.

According to the present invention the compositions herein may be used for the removal of stains and soils as well as of odors from carpets or hard wearing textiles and fabrics, e.g., upholstery. In addition the compositions according to the present invention may be used to hygienise, disinfect and/or exterminate microinsects from carpets or hard wearing textiles and fabrics, e.g., upholstery, rugs, curtains.

The composition

The compositions of the present invention are formulated as liquid compositions. Preferred compositions herein are aqueous compositions and therefore, preferably comprise water more preferably in an amount of from 60% to 98%,

even more preferably of from 80% to 97% and most preferably 85% to 97% by weight of the total composition.

The pH of the liquid compositions according to the present invention may typically be from 1 to 14. In a preferred embodiment, the recommended pH range is from 1 to 10, preferably from pH 2 to 8, more preferably from pH 3 to 7 and most preferably from pH 3.5 to 6.5. Indeed, it has been surprisingly found that cleaning performance is further improved at these preferred pH ranges. Also these preferred pH ranges contribute to the stability of hydrogen peroxide, when present. Accordingly, the compositions herein may further comprise an acid or base to adjust pH as appropriate.

Preferred acids herein are organic or inorganic acids or mixtures thereof. Preferred organic acids are acetic acid, or citric acid or a mixture thereof. Preferred inorganic acids are sulfuric acid or phosphoric acid or a mixture thereof. A particularly preferred acid to be used herein is an inorganic acid and most preferred is sulfuric acid.

Typical levels of such acids, when present, are of from 0.01% to 1.0%, preferably from 0.05% to 0.8% and more preferably from 0.1% to 0.5% by weight of the total composition.

The bases to be used herein can be organic or inorganic bases. Suitable bases for use herein are the caustic alkalis, such as sodium hydroxide, potassium hydroxide and/or lithium hydroxide, and/or the alkali metal oxides such, as sodium and/or potassium oxide or mixtures thereof. A preferred base is a caustic alkali, more preferably sodium hydroxide and/or potassium hydroxide.

Other suitable bases include ammonia, ammonium carbonate and hydrogen carbonate.

Typical levels of such bases, when present, are of from 0.01% to 1.0%, preferably from 0.05% to 0.8% and more preferably from 0.1% to 0.5% by weight of the total composition.

Nonirritating anionic surfactant

As an essential ingredient the composition according to the present invention comprises a nonirritating anionic surfactant rated nonirritating to mucous membranes as measured at a 5% active surfactant solution using the Draize test method.

Typically, the compositions herein may comprise up to 50%, preferably from 0.1% to 20%, more preferably from 0.5% to 10% and most preferably from 1% to 5% by weight of the total composition of said nonirritating anionic surfactant.

Preferably said nonirritating anionic surfactant is a nonirritating anionic surfactant rated nonirritating to mucous membranes as measured at a 10% active surfactant solution using the Draize test method. More preferably said nonirritating anionic surfactant is a nonirritating anionic surfactant rated nonirritating to mucous membranes as measured at a 20% active surfactant solution using the Draize test method.

The Draize test method (Draize, J. H., Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics, Assoc. Food Drug Officials, U.S., Topeka, Kansas, 1959) is used to test ingredients (such as surfactants) in food, drug and/or cosmetic products for their irritation properties to skin, eyes, mucous membranes and the like.

A typical test according to the Draize test method involves between six and nine rabbits. Rabbits are used out of tradition, based on their body size and convenience of use. A predetermined quantity (e.g., 0.1 ml) and concentration (e.g., a 5% active surfactant solution, preferably 10% active surfactant solution, more preferably a 20% active surfactant solution) of the test substance is

dropped, placed or sprayed into the lower eyelid of one eye of each rabbit, with the untreated eye acting as a control. The resulting injuries to the eyes are visually graded by an expert grader who assesses the level of irritation (e.g., as seen as redness) at intervals of 1, 24, 48, 72, and 168 hours after the exposure and subjectively determines an irritancy value for the test substance. The evaluation is based on the degree of redness of the cornea and the inflammation of iris and conjunctiva. The extent of the total irritation is entered into a numbered scale from 0 to 110, wherein 110 means a high extent of irritation. A score between 0 and 10 is required to define a chemical substance as "nonirritating" , i.e., the substance (e.g., the surfactant) is "rated" nonirritating to mucous membranes. A score between 11 and 25 defines a chemical substance as slightly irritant. A score between 26 and 56 defines the chemical substance as moderately irritant. A score between 57 and 110 defines the chemical substance as severely irritant.

It has now been found that a nonirritating benefit is provided when a nonirritating anionic surfactant as described herein is used in a composition that is applied onto a carpet using an electrical spraying device. Said nonirritating benefit is apparent as a reduction or even absence of irritation of the mucous membranes of the user of an electrical spraying device or persons in close proximity thereto.

By "reduced irritation of the mucous membranes" it is meant herein that the irritation of mucous membranes of the user of an electrical spraying device and spraying a nonirritating anionic surfactant as described herein or those in close proximity is reduced compared to the irritation of mucous membranes that can occur when an anionic surfactant not rated nonirritating to mucous membranes as measured at a 5% active surfactant solution using the Draize test method is comprised in the sprayed composition.

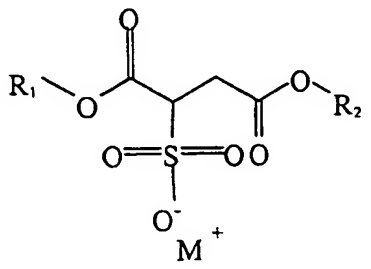
Suitable non irritant anionic surfactants as described herein are selected from the group consisting of sarcosinate surfactants, sulfosuccinate surfactants, alkyl sulphonate surfactants, alkyl sulphate surfactants, sulfosuccinamate surfactants,

sulfosuccinamide surfactants, carboxylate surfactants and mixtures thereof. Preferably, said nonirritating anionic surfactants are selected from the group consisting of sarcosinate surfactants sulfosuccinate surfactants, alkyl sulphonate surfactants, alkyl sulphate surfactants, carboxylate surfactants and mixtures thereof . More preferably, said nonirritating anionic surfactants are selected from the group consisting of sarcosinate surfactants, sulfosuccinate surfactants, alkyl sulphonate surfactants, alkyl sulphate surfactants and mixtures thereof. Even more preferably, said nonirritating anionic surfactants are selected from the group consisting of sulfosuccinate surfactants, alkyl sulphate surfactants, alkyl sulphonate surfactants and mixtures thereof. Most preferably, said nonirritating anionic surfactants are selected from the group consisting of sulfosuccinate surfactants, alkyl sulphate surfactants and mixtures thereof.

Highly preferred nonirritating anionic surfactants herein are sulfosuccinate surfactants.

Indeed, it has been found that sulfosuccinate surfactants are not only nonirritating or less irritating to mucous membranes than other surfactants, but it was also found that they reduce the irritation caused by other surfactants when used in combination (see Surfactant Science Series, Anionic Surfactants, Organic Chemistry vol. 56, p. 341, Marcel Dekker, Inc. NY and Basel).

Suitable sulfosuccinate surfactants are according to the formula



wherein : R_1 is hydrogen or a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20 carbon atoms, preferably 8 to 18 carbon atoms, more preferably 10 to 16 carbon atoms, and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group; R_2 is a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20 carbon atoms, preferably 8 to 18 carbon atoms, more preferably 10 to 16 carbon atoms, and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group; and M is hydrogen or a cationic moiety, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

Such sulfosuccinate surfactants are commercially available under the tradenames Aerosol® from Cytec, Anionyx® from Stepan, Arylene® from Hart, Setacin® from Zschimmer & Schwarz, Mackanate® from McIntyre and Monawet® from Mona Industries.

Suitable alkyl sulphonate surfactants for use herein include water-soluble salts or acids of the formula RSO_3M wherein R is a C_6-C_{20} linear or branched, saturated or unsaturated alkyl group, preferably a C_8-C_{18} alkyl group and more preferably a C_{10}-C_{16} alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium), or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

An example of a C_{14}-C_{16} alkyl sulphonate is Hostapur® SAS available from Hoechst.

Suitable alkyl sulphate surfactants for use herein are according to the formula R_1SO_4M wherein R_1 represents a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

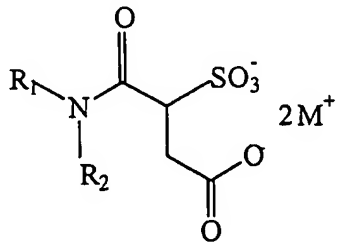
By "linear alkyl sulphate or sulphonate" it is meant herein a non-substituted alkyl sulphate or sulphonate wherein the alkyl chain comprises from 6 to 20 carbon atoms, preferably from 8 to 18 carbon atoms, and more preferably from 10 to 16 carbon atoms, and wherein this alkyl chain is sulphated or sulphonated at one terminus.

By "branched sulphonate or sulphate", it is meant herein an alkyl chain having from 6 to 20 total carbon atoms, preferably from 8 to 18 total carbon atoms, and more preferably from 10 to 16 total carbon atoms, wherein the main alkyl chain is substituted by at least another alkyl chain, and wherein the alkyl chain is sulphated or sulphonated at one terminus.

Particularly preferred branched alkyl sulphates to be used herein are those containing from 10 to 14 total carbon atoms like Isalchem 123 AS®. Isalchem 123 AS® commercially available from Enichem is a C_{12-13} surfactant which is 94% branched. This material can be described as CH_3-$(CH_2)_m$-

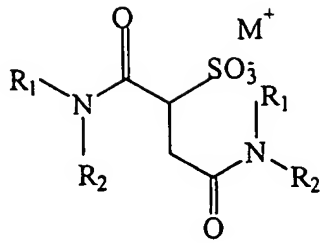
$CH(CH_2OSO_3Na)$-$(CH_2)_n$-CH_3 where n+m=8-9. Also preferred alkyl sulphates are the alkyl sulphates where the alkyl chain comprises a total of 12 carbon atoms, i.e., sodium 2-butyl octyl sulphate. Such alkyl sulphate is commercially available from Condea under the trade name Isofol® 12S. Particularly suitable liner alkyl sulphonates include C12-C16 paraffin sulphonate like Hostapur® SAS commercially available from Hoechst.

Suitable sulfosuccinamate surfactants for use herein are according to the formula



wherein R_1 and R_2 each independently represent a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

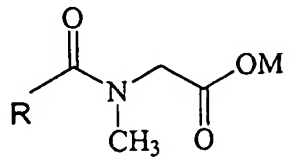
Suitable sulfosuccinamide surfactants for use herein are according to the formula



wherein R_1 and R_2 each independently represent a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

Suitable alkyl carboxylate surfactants for use herein are according to the formula RCO_2M wherein : R represents a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

Suitable sarcosinate surfactants to be used herein include acyl sarcosinate or mixtures thereof, in its acid and/or salt form, preferably long chain acyl sarcosinates having the following formula:



wherein M is hydrogen or a cationic moiety and wherein R is an alkyl group of from 11 to 15 carbon atoms, preferably of from 11 to 13 carbon atoms. Preferred M are hydrogen and alkali metal salts, especially sodium and potassium. Said acyl sarcosinate surfactants are derived from natural fatty acids and the amino-acid sarcosine (N-methyl glycine). They are suitable to be used as aqueous solution of their salt or in their acidic form as powder. Being derivatives of natural fatty acids, said acyl sarcosinates are rapidly and completely biodegradable and have good skin compatibility.

Accordingly, particularly preferred long chain acyl sarcosinates to be used herein include C_{12} acyl sarcosinate, i.e., an acyl sarcosinate according to the above formula wherein M is hydrogen and R is an alkyl group of 11 carbon atom, sodium N-lauroyl sarcosinate, i.e., an acyl sarcosinate according to the above formula wherein M is sodium and R is an alkyl group of 11 carbon atom, and C_{14} acyl sarcosinate (i.e., an acyl sarcosinate according to the above formula wherein M is hydrogen and R is an alkyl group of 13 carbon atoms). , sodium N-lauroyl sarcosinate is commercially available, for example, as Hamposyl L-30® supplied by Hampshire or Crodasinic LS30® supplied by Croda. C_{14} acyl sarcosinate is commercially available, for example, as Hamposyl M-30® supplied by Hampshire or Crodasinic MS30® supplied by Croda.

In a preferred embodiment of the present invention said nonirritating anionic surfactant is a mixture of a sulfosuccinate surfactant and a second nonirritating

anionic surfactant. More preferably, said nonirritating anionic surfactant is a mixture of a sulfosuccinate surfactant and a sulphate surfactant.

Such a mixture of a sulfosuccinate surfactant and a sulphate surfactant is commercially available under the tradename Zoharpon® from Zohar.

The compositions employed in the process of treating carpets according to the present invention provide excellent cleaning performance on various types of soils including diffuse soils (e.g., particulate and/or greasy soils) that tend to accumulate in the so called "high traffic areas" but also in delivering good cleaning performance on other types of stains or soils, i.e., enzymatic stains like blood.

By "high traffic areas" it is meant herein areas with an intensive use of the carpets in such areas as for example near doors.

By "particulate stains" it is meant herein any soils or stains of particulate nature that can be found on any carpet, e.g. clay, dirt, dust, mud, concrete and the like.

By "greasy/oily stains" it is meant herein any soils or stains of greasy/oily nature that can be found on any carpet, e.g., make-up, lipstick, dirty motor oil and mineral oil, greasy food like mayonnaise and spaghetti sauce.

By "enzymatic stains" it is meant herein any soils or stains of enzymatic nature that can be found on any carpet, e.g., grass.

The cleaning performance of a given composition on a soiled carpet may be evaluated by the following test method : A liquid composition according to the present invention is first applied, preferably sprayed, onto the stained portion of a carpet, left to act thereon from 1 to 60 minutes, preferably 30 minutes, after which the carpet is vacuum cleaned using any commercially available vacuum cleaners like for instance a standard Hoover® 1300W vacuuming machine. The

soils used in this test may be particulate stains, greasy/oily stains or enzymatic stain as described above. The cleaning performance may be evaluated by visual using panel score units to rate the cleaning performance.

Optional ingredients

Peroxygen bleach

As an optional but highly preferred ingredient the compositions according to the present invention may comprise a peroxygen bleach.

Suitable peroxygen bleaches to be used herein are selected from the group consisting of : hydrogen peroxide; water soluble sources of hydrogen peroxide; organic or inorganic peracids; hydroperoxides; diacyl peroxides; and mixtures thereof.

As used herein a hydrogen peroxide source refers to any compound that produces perhydroxyl ions when said compound is in contact with water. Suitable water-soluble sources of hydrogen peroxide for use herein are selected from the group consisting of percarbonates, perborates and persilicates and mixtures thereof.

Suitable diacyl peroxides for use herein are selected from the group consisting of aliphatic, aromatic and aliphatic-aromatic diacyl peroxides, and mixtures thereof.

Suitable aliphatic diacyl peroxides for use herein are dilauroyl peroxide, didecanoyl peroxide, dimyristoyl peroxide, or mixtures thereof. A suitable aromatic diacyl peroxide for use herein is for example benzoyl peroxide. A suitable aliphatic-aromatic diacyl peroxide for use herein is for example lauroyl benzoyl peroxide. Such diacyl peroxides have the advantage to be particularly safe to carpets and carpet dyes while delivering excellent bleaching performance.

Suitable organic or inorganic peracids for use herein are selected from the group consisting of : persulphates such as monopersulfate; peroxyacids such as diperoxydodecandioic acid (DPDA); magnesium perphthalic acid; perlauric acid; perbenzoic and alkylperbenzoic acids; and mixtures thereof.

Suitable hydroperoxides for use herein are selected from the group consisting of tert-butyl hydroperoxide, cumyl hydroperoxide, 2,4,4-trimethylpentyl-2-hydroperoxide, di-isopropylbenzene-monohydroperoxide, tert-amyl hydroperoxide and 2,5-dimethyl-hexane-2,5-dihydroperoxide and mixtures thereof. Such hydroperoxides have the advantage to be particularly safe to carpets and carpet dyes while delivering excellent bleaching performance.

Preferred peroxygen bleaches herein are selected from the group consisting of : hydrogen peroxide; water soluble sources of hydrogen peroxide; organic or inorganic peracids; hydroperoxides; and diacyl peroxides; and mixtures thereof. More preferred peroxygen bleaches herein are selected from the group consisting of hydrogen peroxide, water soluble sources of hydrogen peroxide and diacyl peroxides and mixtures thereof. Even more preferred peroxygen bleaches herein are selected from the group consisting of hydrogen peroxide, water soluble sources of hydrogen peroxide, aliphatic diacyl peroxides, aromatic diacyl peroxides and aliphatic-aromatic diacyl peroxides and mixtures thereof. Most preferred peroxygen bleaches herein are hydrogen peroxide, water soluble sources of hydrogen peroxide or mixtures thereof.

Typically, the liquid compositions herein comprise from 0.01% to 20%, preferably from 0.5 % to 10%, and more preferably from 1% to 7% by weight of the total composition of a peroxygen bleach, or mixtures thereof.

The presence of a peroxygen bleach in preferred compositions employed in the process of treating carpets according to the present invention contributes to the excellent cleaning and sanitizing performance on various types of soils including

on spot stains like bleachable stains (e.g., coffee, beverage, food) of the compositions of the present invention.

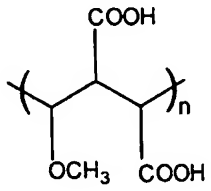
By "bleachable stains" it is meant herein any soils or stains containing ingredients sensitive to bleach that can be found on any carpet, e.g., coffee or tea.

Anti-resoiling agent

The compositions as disclosed herein may comprise as a highly preferred optional ingredient an anti-resoiling agent.

Suitable anti-resoiling agents include anti-resoiling polymers.

Suitable poly (vinyl methyl ether / maleic acid) copolymers are according to the general formula :



wherein n (degree of polymerisation) is an integer of from 50 to 1600, preferably from 100 to 800, and more preferably from 200 to 400.

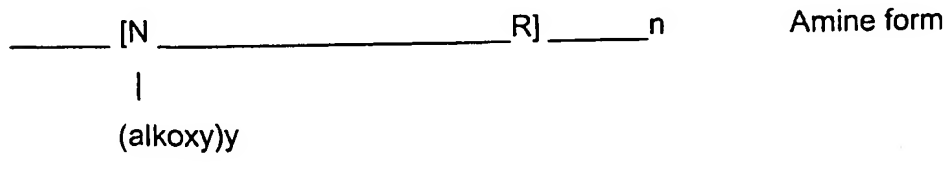
Accordingly, suitable poly (vinyl methyl ether / maleic acid) copolymers for use herein have an average molecular weight of from 1'000 to 10'000'000, preferably 10'000 to 1'000'000, more preferably from 10'000 to 500'000, and most preferably from 50'000 to 100'000.

Suitable poly (vinyl methyl ether / maleic acid) copolymers are commercially available, for instance, from ISP Corporation, New York, NY and Montreal, Canada under the product names Gantrez AN Copolymer® (AN-119 copolymer, average molecular weight of 20'000; AN-139 copolymer, average molecular weight of 41'000; AN-149 copolymer, average molecular weight of 50'000; AN-

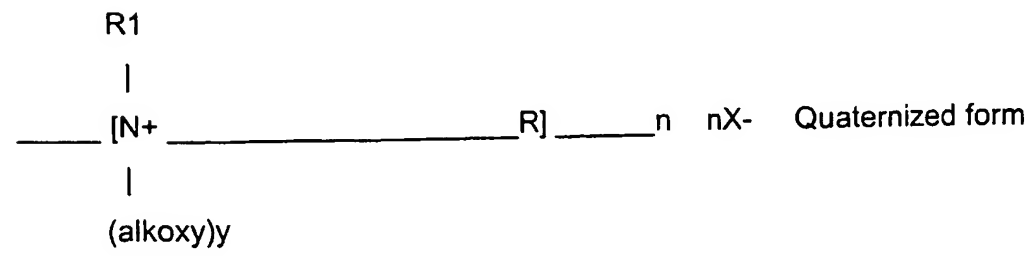
169 copolymer, average molecular weight of 67'000; AN-179 copolymer, average molecular weight of 80'000), Gantrez S® (Gantrez S97®, average molecular weight of 70'000), and Gantrez ES® (ES-225, ES-335, ES-425, ES-435), Gantrez V® (V-215, V-225, V-425).

Preferably the poly (vinyl methyl ether / maleic acid) copolymers are either crosslinked or not crosslinked, i.e., linear. More preferably the poly (vinyl methyl ether / maleic acid) copolymers are not crosslinked.

Suitable anti-resoiling polymers include soil suspending polyamine polymers. Any soil suspending polyamine polymer known to those skilled in the art may also be used herein. Particularly suitable polyamine polymers for use herein are alkoxylated polyamines. Such materials can conveniently be represented as molecules of the empirical structures with repeating units :



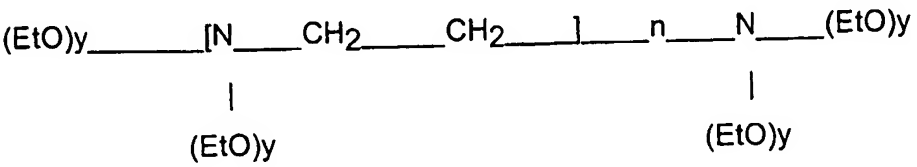
and



wherein R is a hydrocarbyl group, usually of 2-6 carbon atoms; R_1 may be a C_1-C_{20} hydrocarbon; the alkoxy groups are ethoxy, propoxy, and the like, and y is

from 2 to 30, most preferably from 7 to 20; n is an integer of at least 2, preferably from 2 to 40, most preferably from 2 to 5; and X- is an anion such as halide or methylsulfate, resulting from the quaternization reaction.

The most highly preferred polyamines for use herein are the so-called ethoxylated polyethylene amines, i.e., the polymerized reaction product of ethylene oxide with ethyleneimine, having the general formula :



wherein y is from 2 to 50, preferably from 5 to 30, and n is from 1 to 40, preferably from 2 to 40. Particularly preferred for use herein is an ethoxylated polyethylene amine, in particular an ethoxylated polyethylene amine wherein n=2 and y=20, and an ethoxylated polyethylene amine wherein n=40 and y=7.

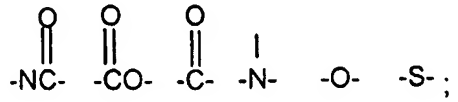
Suitable ethoxylated polyethylene amines are commercially available from Nippon Shokubai CO., LTD under the product names ESP-0620A® (ethoxylated polyethylene amine wherein n=2 and y=20) or from BASF under the product names ES-8165 and from BASF under the product name LUTENSIT K - 187/50 ® (ethoxylated polyethylene amine wherein n=40 and y=7).

Suitable anti-resoiling polymers also include polyamine N-oxide polymers.

Suitable polyamine N-oxide polymers for use herein are according to the following formula : $R\text{-}A_x\text{-}P$; containing at least one N-oxide group (N-O group);

wherein : P is a polymerizable unit to which an N-O group can be attached and/or the N-O group can form part of the polymerizable unit;

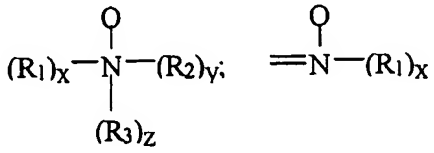
A is one of the following structures:



x is 0 or 1;

and R is an aliphatic, ethoxylated aliphatic, aromatic, heterocyclic or alicyclic group or any combination thereof to which the N-O group can be attached to R or the nitrogen of the N-O group is part of R.

By "N-O group" it is meant one of the following general structures:



wherein R_1, R_2, R_3 are aliphatic, aromatic, heterocyclic or alicyclic groups or combinations thereof; x, y and z are 0 or 1; and the nitrogen of the N-O group can be attached or form part of any of the aforementioned groups.

Any polymerizable unit P can be used as long as the amine oxide polymer formed is water-soluble and provides the carpet treating composition with carpet cleaning and/or carpet anti-resoiling benefits. Preferred polymerizable unit P are vinyl, alkylenes, esters, ethers, amides, imides, acrylates and mixtures thereof. A more preferred polymerizable unit P is vinyl.

Preferred polyamine N-oxide polymers are those wherein R is a heterocyclic group such as pyridine, pyrrole, imidazole, or a derivative thereof, to which the nitrogen of the N-O group can be attached or the N-O group is part of these

groups. Most preferred polyamine N-oxide polymers are those wherein R is a pyridine.

The polyamine N-oxide polymer can be obtained in almost any degree of polymerization. Typically, the average molecular weight is within the range of 1,000 to 100,000; more preferred 5,000 to 100,000; most preferred 5,000 to 25,000.

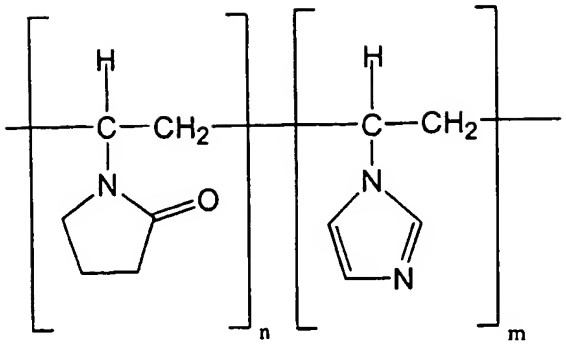
Suitable polyamine N-oxide polymer are polyvinyl pyridine-N-oxide polymers wherein : the polymerizable unit P is vinyl; x=0; and R is pyridine wherein the nitrogen of the N-O group is part of.

Suitable poly vinyl pyridine-N-oxide polymers are commercially available from Hoechst under the trade name of Hoe S 4268®, and from Reilly Industries Inc. under the trade name of PVNO.

Furthermore, suitable anti-resoiling polymers include N-vinyl polymer.

Suitable N-vinyl polymers include polyvinyl pyrrolidone polymers, co-polymers of N-vinylpyrrolidone and N-vinylimidazole, co-polymers of N-vinylpyrrolidone and acrylic acid, and mixtures thereof.

Suitable co-polymers of N-vinylpyrrolidone and N-vinylimidazole polymers (referred to as a class as "PVPVI") are according to the formula :



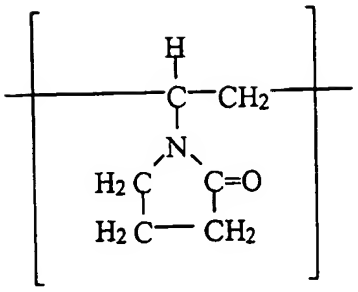
in which n is between 50 and 500 and preferably between 80 and 200 and m is between 50 and 500 and preferably between 80 and 200.

Preferably the PVPVI has an average molecular weight range from 1,000 to 100,000, more preferably from 5,000 to 100,000, and most preferably from 5,000 to 20,000. (The average molecular weight range is determined by light scattering as described in Barth, et al., Chemical Analysis, Vol 113. "Modern Methods of Polymer Characterization", the disclosures of which are incorporated herein by reference.)

The PVPVI co-polymers typically have a molar ratio of N-vinylimidazole to N-vinylpyrrolidone from 1:1 to 0.2:1, more preferably from 0.8:1 to 0.3:1, most preferably from 0.6:1 to 0.4:1. These co-polymers can be either linear or branched.

Suitable co-polymers of N-vinylpyrrolidone and N-vinylimidazole are commercially available from BASF, under the trade name of Sokalan® PG55.

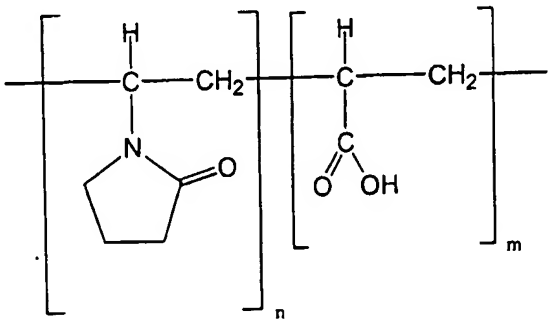
Suitable polyvinylpyrrolidone ("PVP") for use herein are homopolymers of N-vinylpyrrolidone having the following repeating monomer:



Preferred vinylpyrrolidone homopolymers for use herein have an average molecular weight of from 1,000 to 100,000, preferably from 5,000 to 100,000, and more preferably from 5,000 to 20,000.

Suitable vinylpyrrolidone homopolymers are commercially available from BASF under the trade names Luviskol® K15 (viscosity molecular weight of 10,000), Luviskol® K25 (viscosity molecular weight of 24,000), Luviskol® K30 (viscosity molecular weight of 40,000), and other vinylpyrrolidone homopolymers known to persons skilled in the detergent field (see for example EP-A-262,897 and EP-A-256,696).

Suitable co-polymers of N-vinylpyrrolidone and acrylic acid (referred to as a class as "PV/AA") are according to the formula :



in which n is between 50 and 1000 and preferably between 100 and 200 and m is between 150 and 3000 and preferably between 300 and 600.

Preferably the PV/AA have an average molecular weight range from 1,000 to 100,000, more preferably from 5,000 to 100,000, and most preferably from 5,000 to 25,000.

Suitable co-polymers of N-vinylpyrrolidone and acrylic acid are commercially available from BASF under the trade name Sokalan® PG 310.

Preferred N-vinyl polymers are polyvinyl pyrrolidone polymers, co-polymers of N-vinylpyrrolidone and N-vinylimidazole, co-polymers of N-vinylpyrrolidone and acrylic acid, and mixtures thereof, even more preferred are polyvinyl pyrrolidone polymers.

Suitable anti-resoiling polymers also include soil suspending polycarboxylate polymers.

Any soil suspending polycarboxylate polymer known to those skilled in the art can be used according to the present invention such as homo- or co-polymeric polycarboxylic acids or their salts including polyacrylates and copolymers of maleic anhydride or/and acrylic acid and the like. Indeed, such soil suspending polycarboxylate polymers can be prepared by polymerizing or copolymerizing suitable unsaturated monomers, preferably in their acid form. Unsaturated monomeric acids that can be polymerized to form suitable polymeric polycarboxylates include acrylic acid, maleic acid (or maleic anhydride), fumaric acid, itaconic acid, aconitic acid, mesaconic acid, citraconic acid and methylenemalonic acid. The presence in the polymeric polycarboxylates herein of monomeric segments, containing no carboxylate radicals such as vinylmethyl ether, styrene, ethylene, etc. is suitable provided that such segments do not constitute more than 40% by weight.

Particularly suitable polymeric polycarboxylates to be used herein can be derived from acrylic acid. Such acrylic acid-based polymers which are useful herein are

the water-soluble salts of polymerized acrylic acid. The average molecular weight of such polymers in the acid form preferably ranges from 2,000 to 10,000, more preferably from 4,000 to 7,000 and most preferably from 4,000 to 5,000. Water-soluble salts of such acrylic acid polymers can include, for example, the alkali metal, ammonium and substituted ammonium salts. Soluble polymers of this type are known materials. Use of polyacrylates of this type in detergent compositions has been disclosed, for example, in Diehl, U.S. Patent 3,308,067, issued March 7, 1967.

Acrylic/maleic-based copolymers may also be used as a preferred soil suspending polycarboxylic polymer. Such materials include the water-soluble salts of copolymers of acrylic acid and maleic acid. The average molecular weight of such copolymers in the acid form preferably ranges from 2,000 to 100,000, more preferably from 5,000 to 75,000, most preferably from 7,000 to 65,000. The ratio of acrylate to maleate segments in such copolymers will generally range from 30:1 to 1:1, more preferably from 10:1 to 2:1. Water-soluble salts of such acrylic acid/maleic acid copolymers can include, for example, the alkali metal, ammonium and substituted ammonium salts. Soluble acrylate/maleate copolymers of this type are known materials which are described in European Patent Application No. 66915, published December 15, 1982. Particularly preferred is a copolymer of maleic / acrylic acid with an average molecular weight of 70,000. Such copolymers are commercially available from BASF under the trade name SOKALAN® CP5.

Other suitable anti-resoiling polymers include those anti-resoiling polymers having: (a) one or more nonionic hydrophile components consisting essentially of (i) polyoxyethylene segments with a degree of polymerization of at least 2, or (ii) oxypropylene or polyoxypropylene segments with a degree of polymerization of from 2 to 10, wherein said hydrophile segment does not encompass any oxypropylene unit unless it is bonded to adjacent moieties at each end by ether linkages, or (iii) a mixture of oxyalkylene units comprising oxyethylene and from 1 to about 30 oxypropylene units wherein said mixture contains a sufficient amount

of oxyethylene units such that the hydrophile component has hydrophilicity great enough to increase the hydrophilicity of conventional polyester synthetic fiber surfaces upon deposit of the soil release agent on such surface, said hydrophile segments preferably comprising at least about 25% oxyethylene units and more preferably, especially for such components having about 20 to 30 oxypropylene units, at least about 50% oxyethylene units; or (b) one or more hydrophobe components comprising (i) C_3 oxyalkylene terephthalate segments, wherein, if said hydrophobe components also comprise oxyethylene terephthalate, the ratio of oxyethylene terephthalate: C_3 oxyalkylene terephthalate units is about 2:1 or lower, (ii) C_4-C_6 alkylene or oxy C_4-C_6 alkylene segments, or mixtures therein, (iii) poly (vinyl ester) segments, preferably polyvinyl acetate), having a degree of polymerization of at least 2, or (iv) C_1-C_4 alkyl ether or C_4 hydroxyalkyl ether substituents, or mixtures therein, wherein said substituents are present in the form of C_1-C_4 alkyl ether or C_4 hydroxyalkyl ether cellulose derivatives, or mixtures therein, and such cellulose derivatives are amphiphilic, whereby they have a sufficient level of C_1-C_4 alkyl ether and/or C_4 hydroxyalkyl ether units to deposit upon conventional polyester synthetic fiber surfaces and retain a sufficient level of hydroxyls, once adhered to such conventional synthetic fiber surface, to increase fiber surface hydrophilicity, or a combination of (a) and (b).

Typically, the polyoxyethylene segments of (a)(i) will have a degree of polymerization of from about 1 to about 200, although higher levels can be used, preferably from 3 to about 150, more preferably from 6 to about 100. Suitable oxy C_4-C_6 alkylene hydrophobe segments include, but are not limited to, end-caps of polymeric soil release agents such as $MO_3S(CH_2)_nOCH_2CH_2O$-, where M is sodium and n is an integer from 4-6, as disclosed in U.S. Patent 4,721,580, issued January 26, 1988 to Gosselink.

Anti-resoiling polymers useful in the present invention also include cellulosic derivatives such as hydroxyether cellulosic polymers, co-polymeric blocks of ethylene terephthalate or propylene terephthalate with polyethylene oxide or

polypropylene oxide terephthalate, and the like. Such anti-resoiling polymers are commercially available and include hydroxyethers of cellulose such as METHOCEL® (Dow). Cellulosic anti-resoiling polymers for use herein also include those selected from the group consisting of C_1-C_4 alkyl and C_4 hydroxyalkyl cellulose; see U.S. Patent 4,000,093, issued December 28, 1976 to Nicol, et al.

Anti-resoiling polymers characterised by poly(vinyl ester) hydrophobe segments include graft co-polymers of poly(vinyl ester), e.g., C_1-C_6 vinyl esters, preferably poly(vinyl acetate) grafted onto polyalkylene oxide backbones, such as polyethylene oxide backbones. See European Patent Application 0 219 048, published April 22, 1987 by Kud, et al. Commercially available anti-resoiling polymers of this kind include the SOKALAN® type of material, e.g., SOKALAN HP-22®, available from BASF.

One type of preferred anti-resoiling polymers is a co-polymer having random blocks of ethylene terephthalate and polyethylene oxide (PEO) terephthalate. The molecular weight of this anti-resoiling polymers is in the range of from about 25,000 to about 55,000. See U.S. Patent 3,959,230 to Hays, issued May 25, 1976 and U.S. Patent 3,893,929 to Basadur issued July 8, 1975.

Another preferred anti-resoiling polymers is a polyester with repeat units of ethylene terephthalate units which contains 10-15% by weight of ethylene terephthalate units together with 90-80% by weight of polyoxyethylene terephthalate units, derived from a polyoxyethylene glycol of average molecular weight 300-5,000. Examples of this polymer include the commercially available material ZELCON 5126® (from Dupont) and MILEASE T® (from ICI). See also U.S. Patent 4,702,857, issued October 27, 1987 to Gosselink.

Another preferred anti-resoiling polymers agent is a sulfonated product of a substantially linear ester oligomer comprised of an oligomeric ester backbone of

terephthaloyl and oxyalkyleneoxy repeat units and terminal moieties covalently attached to the backbone. These anti-resoiling polymers are fully described in U.S. Patent 4,968,451, issued November 6, 1990 to J.J. Scheibel and E.P. Gosselink. Other suitable anti-resoiling polymers include the terephthalate polyesters of U.S. Patent 4,711,730, issued December 8, 1987 to Gosselink et al, the anionic end-capped oligomeric esters of U.S. Patent 4,721,580, issued January 26, 1988 to Gosselink, and the block polyester oligomeric compounds of U.S. Patent 4,702,857, issued October 27, 1987 to Gosselink.

Preferred anti-resoiling polymers also include the soil release agents of U.S. Patent 4,877,896, issued October 31, 1989 to Maldonado et al, which discloses anionic, especially sulfoaroyl, end-capped terephthalate esters.

Still another preferred anti-resoiling agent is an oligomer with repeat units of terephthaloyl units, sulfoisoterephthaloyl units, oxyethyleneoxy and oxy-1,2-propylene units. The repeat units form the backbone of the oligomer and are preferably terminated with modified isethionate end-caps. A particularly preferred anti-resoiling agent of this type comprises about one sulfoisophthaloyl unit, 5 terephthaloyl units, oxyethyleneoxy and oxy-1,2-propyleneoxy units in a ratio of from about 1.7 to about 1.8, and two end-cap units of sodium 2-(2-hydroxyethoxy)-ethanesulfonate. Said anti-resoiling agent also comprises from about 0.5% to about 20%, by weight of the oligomer, of a crystalline-reducing stabilizer, preferably selected from the group consisting of xylene sulfonate, cumene sulfonate, toluene sulfonate, and mixtures thereof. See U.S. Pat. No. 5,415,807, issued May 16, 1995, to Gosselink et al.

The liquid compositions may comprise from 0.01% to 10%, preferably from 0.01% to 5%, and more preferably from 0.05% to 2% by weight of the total composition of a further anti-resoiling agent.

A preferred anti-resoiling agent is an anti-resoiling polymer. A more preferred anti-resoiling agent is a poly (vinyl methyl ether / maleic acid) copolymer, a soil

suspending polyamine polymer, a poly vinyl pyridine-N-oxide polymer or a mixture thereof. An even more preferred anti-resoiling agent is a poly (vinyl methyl ether / maleic acid) copolymer, an alkoxylated polyamine polymer, a poly vinyl pyridine-N-oxide polymer or a mixture thereof. The most preferred anti-resoiling agent useful in the compositions herein are selected from the group consisting of : a poly (vinyl methyl ether / maleic acid) copolymer; an ethoxylated polyethylene amine according to the formula as described above wherein n=2 and y=20; an ethoxylated polyethylene amine according to the formula as described herein wherein n=40 and y=7; a poly vinyl pyridine-N-oxide polymer; and mixtures thereof.

Volatile organic compounds

As an optional but highly preferred ingredient the compositions according to the present invention may comprise a volatile organic compound (VOC) or a mixture thereof.

Typically, the compositions herein may comprise up to 90%, preferably from 0.1% to 20%, more preferably from 0.5% to 10% and most preferably from 1% to 5% by weight of the total composition of a volatile organic compound or a mixture thereof.

Suitable volatile organic compounds for use herein are selected from the group consisting of : an aliphatic and/or aromatic alcohol; a glycol ethers and/or a derivative thereof; a polyol; and a mixture thereof.

Suitable aromatic alcohols to be used herein are according to the formula R_1-OH wherein R_1 is an alkyl substituted or non-alkyl substituted aryl group of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 2 to 10. A suitable aromatic alcohol to be used herein is benzyl alcohol.

Suitable aliphatic alcohols to be used herein are according to the formula R_2-OH wherein R_2 is a linear or branched saturated or unsaturated hydrocarbon chain of from 1 to 20 carbon atoms, preferably from 1 to 10 and more preferably from 2 to 6. Highly preferred herein are aliphatic alcohols with 2 to 4 carbon atoms and most preferably 4 carbon atoms, or mixtures thereof. Suitable aliphatic alcohols to be used herein include linear alcohol like 2-octanol, decanol, isopropyl alcohol, propyl alcohol, ethanol and/or methanol. Highly preferred herein are ethanol, isopropyl alcohol or a mixture thereof.

Ethanol may be commercially available from Eridania Italia under its chemical name.

Isopropanol may be commercially available from Merck/BDH Italia under its chemical name.

Suitable glycol ethers and/or derivatives thereof to be used herein include monoglycol ethers and/or derivatives thereof, polyglycol ethers and/or derivatives thereof and mixtures thereof.

Suitable monoglycol ethers and derivatives thereof to be used herein include n-buthoxypropanol (n-BP), water-soluble CELLOSOLVE® solvents or mixtures thereof. Preferred Cellosolve® solvents include propoxy ethyl acetate salt (i.e., Propyl Cellosolve acetate salt®), ethanol-2-butoxy phosphate salt (i.e., Butyl Cellosolve phosphate salt®), 2-(Hexyloxy)ethanol (i.e., 2-hexyl Cellosolve®), 2-ethoxy ethanol (i.e., 2-ethyl Cellosolve®), 2-butoxyethanol (i.e., 2-buthyl Cellosolve®) or mixtures thereof.

Suitable polyglycol ethers and derivatives thereof to be used herein include n-butoxypropoxypropanol (n-BPP), butyl triglycol ether (BTGE), butyl diglycol ether (BDGE), water-soluble CARBITOL® solvents or mixtures thereof.

Preferred water-soluble CARBITOL® solvents are compounds of the 2-(2-alkoxyethoxy)ethanol class, 2-(2-alkoxyethoxy)propanol class and/or 2-(2-alkoxyethoxy)butanol class wherein the alkoxy group is derived from ethyl, propyl or butyl. A preferred water-soluble carbitol is 2-(2-butoxyethoxy)ethanol also known as butyl carbitol®.

Preferred glycol ethers and/or derivatives thereof are 2-ethoxyethanol, 2-butoxyethanol, n-butoxypropoxypropanol, butyl carbitol® or mixtures thereof.

Suitable polyol solvents to be used herein are the polyols having at least 2 hydroxyl groups (-OH) like diols. Suitable diols to be used herein include 2-ethyl-1,3-hexanediol, 2,2,4-trimethyl-1,3-pentanediol, methyl-2,4 pentanediol or mixture thereof.

The volatile organic compounds, when present, further contribute to the excellent overall cleaning performance of the present invention. Additionally, their addition in the compositions herein also enhances the sanitising properties of the compositions.

Surfactants

Preferred compositions according to the present invention typically comprise an additional surfactant or a mixture thereof on top of the nonirritating anionic surfactant as described above.

Typically, the compositions herein may comprise up to 50%, preferably from 0.1% to 20%, more preferably from 0.5% to 10% and most preferably from 1% to 5% by weight of the total composition of an additional surfactant.

Suitable additional surfactants may be selected from those well known in the art including anionic surfactants on top of the nonirritating anionic surfactant as described above, nonionic surfactants, zwitterionic surfactants, amphoteric surfactants and cationic surfactants and mixtures thereof.

Suitable nonionic surfactants include amine oxide surfactants. Suitable amine oxide surfactants are according to the formula $R_1R_2R_3NO$, wherein each of R_1, R_2 and R_3 is independently a saturated substituted or unsubstituted, linear or branched alkyl groups of from 1 to 30 carbon atoms, preferably of from 1 to 20 carbon atoms, and mixtures thereof.

Particularly preferred amine oxide surfactants to be used according to the present invention are amine oxide surfactants having the following formula $R_1R_2R_3NO$ wherein R_1 is a saturated linear or branched alkyl group of from 1 to 30 carbon atoms, preferably of from 6 to 20 carbon atoms, more preferably of from 6 to 16 carbon atoms, and wherein R_2 and R_3 are independently substituted or unsubstituted, linear or branched alkyl groups of from 1 to 4 carbon atoms, preferably of from 1 to 3 carbon atoms, and more preferably are methyl groups. Preferred amine oxide surfactants used herein are pure-cut amine oxide surfactants, i.e., a pure single amine oxide surfactant, e.g. C_8 N,N-dimethyl amine oxide, as opposed to mixtures of amine oxide surfactants of different chain lengths

Suitable amine oxide surfactants for use herein are for instance pure cut C_8 amine oxide, pure cut C_{10} amine oxide, pure cut C_{14} amine oxide, natural blend C_8-C_{10} amine oxides as well as natural blend C_{12}-C_{16} amine oxides. Such amine oxide surfactants may be commercially available from Hoechst or Stephan.

Suitable nonionic surfactants for use herein also include any ethoxylated C_6-C_{24} fatty alcohol nonionic surfactant, alkyl propoxylates and mixtures thereof, fatty acid C_6-C_{24} alkanolamides, C_6-C_{20} polyethylglycol ethers, polyethylene glycol with molecular weight 1000 to 80000 and glucose amides, alkyl pyrrolidones.

Suitable cationic surfactants for use herein include quaternary ammonium compounds of the formula $R_1R_2R_3R_4N+$ where R_1,R_2 and R_3 are methyl groups, and R_4 is a C_{12-15} alkyl group, or where R1 is an ethyl or hydroxy ethyl group, R_2 and R_3 are methyl groups and R_4 is a C_{12-15} alkyl group.

Suitable zwitterionic surfactants are zwitterionic betaine surfactants. Suitable zwitterionic betaine surfactants for use herein contain both a cationic hydrophilic group, i.e., a quaternary ammonium group, and anionic hydrophilic group on the same molecule at a relatively wide range of pH's. The typical anionic hydrophilic groups are carboxylates and sulphonates, although other groups like sulfates, phosphonates, and the like can be used. A generic formula for the zwitterionic betaine surfactant to be used herein is :

R_1-N+(R_2)(R_3)R_4X-

wherein R_1 is a hydrophobic group; R_2 is hydrogen, C_1-C_6 alkyl, hydroxy alkyl or other substituted C_1-C_6 alkyl group; R_3 is C_1-C_6 alkyl, hydroxy alkyl or other substituted C_1-C_6 alkyl group which can also be joined to R_2 to form ring structures with the N, or a C_1-C_6 sulphonate group; R_4 is a moiety joining the cationic nitrogen atom to the hydrophilic group and is typically an alkylene, hydroxy alkylene, or polyalkoxy group containing from 1 to 10 carbon atoms; and X is the hydrophilic group, which is a carboxylate or sulphonate group.

Preferred hydrophobic groups R_1 are aliphatic or aromatic, saturated or unsaturated, substituted or unsubstituted hydrocarbon chains that can contain linking groups such as amido groups, ester groups. More preferred R_1 is an alkyl group containing from 1 to 24, preferably from 8 to 18, and more preferably from 10 to 16 carbon atoms. These simple alkyl groups are preferred for cost and stability reasons. However, the hydrophobic group R_1 can also be an amido radical of the formula R_a-C(O)-NH-(C(R_b)$_2$)m, wherein R_a is an aliphatic or

aromatic, saturated or unsaturated, substituted or unsubstituted hydrocarbon chain, preferably an alkyl group containing from 8 up to 20, preferably up to 18, more preferably up to 16 carbon atoms, R_b is selected from the group consisting of hydrogen and hydroxy groups, and m is from 1 to 4, preferably from 2 to 3, more preferably 3, with no more than one hydroxy group in any $(C(R_b)_2)$ moiety.

Preferred R_2 is hydrogen, or a C_1-C_3 alkyl and more preferably methyl. Preferred R3 is C_1-C_4 sulphonate group, or a C_1-C_3 alkyl and more preferably methyl. Preferred R_4 is $(CH_2)_n$ wherein n is an integer from 1 to 10, preferably from 1 to 6, more preferably is from 1 to 3.

Some common examples of betaine/sulphobetaine are described in U.S. Pat. Nos. 2,082,275, 2,702,279 and 2,255,082, incorporated herein by reference.

Examples of particularly suitable alkyldimethyl betaines include coconut-dimethyl betaine, lauryl dimethyl betaine, decyl dimethyl betaine, 2-(N-decyl-N, N-dimethyl-ammonia)acetate, 2-(N-coco N, N-dimethylammonio) acetate, myristyl dimethyl betaine, palmityl dimethyl betaine, cetyl dimethyl betaine, stearyl dimethyl betaine. For example Coconut dimethyl betaine is commercially available from Seppic under the trade name of Amonyl 265®. Lauryl betaine is commercially available from Albright & Wilson under the trade name Empigen BB/L®.

Examples of amidobetaines include cocoamidoethylbetaine, cocoamidopropyl betaine or C_{10}-C_{14} fatty acylamidopropylene(hydropropylene)sulfobetaine. For example C_{10}-C_{14} fatty acylamidopropylene(hydropropylene)sulfobetaine is commercially available from Sherex Company under the trade name "Varion CAS® sulfobetaine".

A further example of betaine is Lauryl-immino-dipropionate commercially available from Rhone-Poulenc under the trade name Mirataine H2C-HA®.

A preferred additional surfactant for use herein is a zwitterionic surfactant, a nonionic surfactant or a cationic surfactant or a mixture thereof, a more preferred surfactant is a zwitterionic betaine surfactant.

Other optional ingredients

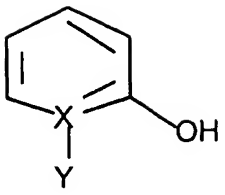
The compositions herein may further comprise conventional carpet cleaning ingredients. Preferably, the compositions herein may comprises a number of additional compounds selected from the group consisting of stabilising agents, chelating agents, builder systems, radical scavengers, perfumes, dyes, suds suppressing agents, enzymes, photobleaching agents, bleach activators and other minors and mixtures thereof.

In a preferred embodiment, the compositions herein may further comprises a number of additional compounds selected from the group consisting of stabilising agents, chelating agents, builder systems, radical scavengers, perfumes, dyes, suds suppressing agents, enzymes, photobleaching agents, bleach activators and other minors and mixtures thereof.

Stabilizing agents

The compositions of the present invention may further comprise a stabilizing agent selected from the group consisting of hydroxy pyridine N-oxides or derivatives thereof and mixtures thereof.

Suitable hydroxy pyridine N-oxides or derivatives thereof are according to the following formula:



wherein X is nitrogen, Y is one of the following groups oxygen, -CHO, -OH, -(CH_2)n-COOH, wherein n is an integer of from 0 to 20, preferably of from 0 to 10 and more preferably is 0, and wherein Y is preferably oxygen. Accordingly particularly preferred hydroxy pyridine N-oxides or derivatives thereof to be used herein is 2-hydroxy pyridine N-oxide.

Hydroxy pyridine N-oxides or derivatives thereof may be commercially available from Sigma.

Typically, the compositions herein may comprise up to 2%, preferably from 0.001% to 1% and more preferably from 0.001% to 0.5% by weight of the total composition of a hydroxy pyridine N-oxide or derivatives thereof or mixtures thereof.

Chelating agents

The compositions of the present invention may further comprise a chelating agent.

Suitable chelating agents are those known to those skilled in the art. Particularly suitable chelating agents include for examples phosphonate chelating agents, polyfunctionally-substituted aromatic chelating agents, amino carboxylate chelating agents, other chelating agents like ethylene diamine N,N'- disuccinic acid and mixtures thereof.

Typically, the compositions herein may comprise up to 4%, preferably from 0.001% to 1%, and more preferably from 0.001% to 0.5% by weight of the total composition of a chelating agent.

Suitable phosphonate chelating agents to be used herein may include ethydronic acid, alkali metal ethane 1-hydroxy diphosphonates as well as amino phosphonate compounds, including amino alkylene poly (alkylene phosphonate), alkali metal ethane 1-hydroxy diphosphonates, nitrilo trimethylene phosphonates, ethylene diamine tetra methylene phosphonates, and diethylene triamine penta methylene phosphonates. The phosphonate compounds may be present either in their acid form or as salts of different cations on some or all of their acid functionalities. Preferred phosphonate chelating agents to be used herein are diethylene triamine penta methylene phosphonates (DETPMP). Such phosphonate chelating agents are commercially available from Monsanto under the trade name DEQUEST®.

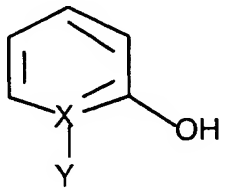
Polyfunctionally-substituted aromatic chelating agents may also be useful in the compositions herein. See U.S. patent 3,812,044, issued May 21, 1974, to Connor et al. Preferred compounds of this type in acid form are dihydroxydisulfobenzenes such as 1,2-dihydroxy -3,5-disulfobenzene.

A preferred biodegradable chelating agent for use herein is ethylene diamine N,N'- disuccinic acid, or alkali metal, or alkaline earth, ammonium or substitutes ammonium salts thereof or mixtures thereof. Ethylenediamine N,N'- disuccinic acids, especially the (S,S) isomer, have been extensively described in US patent 4, 704, 233, November 3, 1987. to Hartman and Perkins. Ethylenediamine N,N'-disuccinic acid is, for instance, commercially available under the tradename ssEDDS® from Palmer Research Laboratories.

Suitable amino carboxylate chelating agents to be used herein include ethylene diamine tetra acetates, diethylene triamine pentaacetates, diethylene triamine pentaacetate (DTPA), N-hydroxyethylethylenediamine triacetates, nitrilotri-acetates, ethylenediamine tetrapropionates, triethylenetetraaminehexa-acetates, ethanoldiglycines, propylene diamine tetracetic acid (PDTA) and methyl glycine di-acetic acid (MGDA), both in their acid form, or in their alkali metal, ammonium,

and substituted ammonium salt forms. A particularly suitable amino carboxylate to be used herein is diethylene triamine penta acetic acid (DTPA).

Other suitable chelating agents to be used herein include salicylic acid or derivatives thereof, or mixtures thereof according to the following formula:



wherein X is carbon, Y is one of the following groups -CHO, -OH, -(CH2)n-COOH, and preferably is -(CH2)n-COOH, and wherein n is an integer of from 0 to 20, preferably of from 0 to 10 and more preferably is 0. Salicylic acid and derivatives thereof may be used herein either in their acid form or in their salts form as for example sodium salts.

Salicylic acid is particularly preferred herein and may be commercially available from Rhone Poulenc.

Bleach activators

In an embodiment of the present invention where the compositions herein comprise a peroxygen bleach, preferably hydrogen peroxide, said compositions may further comprise a bleach activator, as an optional ingredient.

By "bleach activator", it is meant herein a compound which reacts with the peroxygen bleach, preferably hydrogen peroxide, to form a peracid. The peracid thus formed constitutes the activated bleach.

Suitable bleach activators to be used herein include those belonging to the class of esters, amides, imides, or anhydrides. Examples of suitable compounds of this

type are disclosed in British Patent GB 1 586 769 and GB 2 143 231 and a method for their formation into a prilled form is described in European Published Patent Application EP-A-62 523. Suitable examples of such compounds to be used herein are tetracetyl ethylene diamine (TAED), sodium 3,5,5 trimethyl hexanoyloxybenzene sulphonate, diperoxy dodecanoic acid as described for instance in US 4 818 425 and nonylamide of peroxyadipic acid as described for instance in US 4 259 201 and n-nonanoyloxybenzenesulphonate (NOBS). Also suitable are N-acyl caprolactam selected from the group consisting of substituted or unsubstituted benzoyl caprolactam, octanoyl caprolactam, nonanoyl caprolactam, hexanoyl caprolactam, decanoyl caprolactam, undecenoyl caprolactam, formyl caprolactam, acetyl caprolactam, propanoyl caprolactam, butanoyl caprolactam pentanoyl caprolactam or mixtures thereof. A particular family of bleach activators of interest was disclosed in EP 624 154, and particularly preferred in that family is acetyl triethyl citrate (ATC). Acetyl triethyl citrate has the advantage that it is environmentally friendly as it eventually degrades into citric acid and alcohol. Furthermore, acetyl triethyl citrate has a good hydrolytical stability in the composition upon storage and it is an efficient bleach activator.

The compositions according to the present invention may comprise up to 30%, preferably from 1% to 20%, and more preferably from 2% to 10% by weight of the total composition of a bleach activator.

Builders

The compositions according to the present invention may further comprise a builder system. Any conventional builder system known in the art is suitable for use herein. Suitable builders for use herein include derivatives of succinic acid of the formula R-CH(COOH)CH_2(COOH) wherein R is C_{10-20} alkyl or alkenyl, preferably C_{12-16} alkyl or alkenyl, or wherein R can be substituted with hydroxyl, sulpho sulphoxyl or sulphone substituents. Specific examples include lauryl succinate, myristyl succinate, palmityl succinate, 2-dodecenylsuccinate, 2-

tetradecenyl succinate. Succinate builders are preferably used in the form of their water-soluble salts, including sodium, potassium, ammonium and alkanolammonium salts.

Other suitable builders are oxodisuccinates and mixtures of tartrate monosuccinic and tartrate disuccinic acid such as described in US 4,663,071.

Further suitable builders for use herein are fatty acid builders including saturated or unsaturated C_{10-18} fatty acids, as well as the corresponding soaps. Preferred saturated species have from 12 to 16 carbon atoms in the alkyl chain. The preferred unsaturated fatty acid is oleic acid.

The compositions herein may comprise up to 10%, preferably from 1% to 7% by weight of the total composition of a builder system.

Radical scavengers:

The compositions herein may comprise a radical scavenger as another optional ingredient. Suitable radical scavengers for use herein include the well-known substituted mono and di hydroxy benzenes and derivatives thereof, alkyl- and aryl carboxylates and mixtures thereof. Preferred radical scavengers for use herein include di-tert-butyl hydroxy toluene (BHT), p-hydroxy-toluene, hydroquinone (HQ), di-tert-butyl hydroquinone (DTBHQ), mono-tert-butyl hydroquinone (MTBHQ), tert-butyl-hydroxy anysole (BHA), p-hydroxy-anysol, benzoic acid, 2,5-dihydroxy benzoic acid, 2,5-dihydroxyterephtalic acid, toluic acid, catechol, t-butyl catechol, 4-allyl-catechol, 4-acetyl catechol, 2-methoxy-phenol, 2-ethoxy-phenol, 2-methoxy-4-(2-propenyl)phenol, 3,4-dihydroxy benzaldehyde, 2,3-dihydroxy benzaldehyde, benzylamine, 1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl) butane, tert-butyl-hydroxy-anyline, p-hydroxy anyline as well as n-propyl-gallate. Highly preferred for use herein is di-tert-butyl hydroxy toluene, which is for example commercially available from SHELL under the trade name IONOL CP® and/or tert-butyl-hydroxy anysole and/or propyl gallate. These radical scavengers further contribute to the stability of the compositions herein.

Typically, the compositions according to the present invention may comprise up to 5%, preferably from 0.002% to 1.5% by weight and more preferably from 0.002% to 0.5% by weight of the total composition of a radical scavenger.

Examples

The following examples will further illustrate the present invention. The compositions are made by combining the listed ingredients in the listed proportions (weight % unless otherwise specified). The following Examples are meant to exemplify compositions used in a process according to the present invention but are not necessarily used to limit or otherwise define the scope of the present invention.

Compositions (weight %)	**I**	**II**	**III**	**IV**	**V**	**VI**
Hydrogen peroxide	4.0	4.0	---	6.0	4.0	4.0
PVNO	0.5	0.4	0.2	0.5	1.0	2.0
PVPVI	---	---	---	0.5	---	---
PV/AA	---	---	0.3	---	---	---
PVP	---	---	---	---	0.1	---
Ethanol	3.0	2.0	1.0	3.0	3.0	3.0
PnB	---	1.0	0.5	---	---	---
PA	---	0.1	0.2	0.1	---	0.1
Dioctyl sodium sulphosuccinate	1.0	---	0.3	---	2.5	5.0
Disodium lauryl sulphosuccinate	---	2.5	0.7	---	0.5	---
Disodium laureth sulphosuccinate	---	---	1.0	3.0	---	---

Disodium lauramido MEA sulphosuccinate	0.5	---	---	---	---	---
Sodium lauryl sulfate	---	0.5	---	---	---	---
BHT	0.01	0.01	0.02	0.01	---	0.01
AMCP	---	---	---	---	0.5	---
Chelant*	0.2	0.2	0.2	0.2	0.3	0.3
Na CnAS	---	---	---	3.0	0.5	---
Salicylic Acid	0.5	0.5	0.5	0.5	---	0.5
Propyl Gallate	---	---	---	---	1.0	---
NaOH	0.16	0.16	0.16	0.16	0.06	0.26
Water and minors	Balance	Balance	Balance	Balance	Balance	Balance
up to pH	6	6	6	6	3.5	8

PVP is Poly Vinyl Pyrrolidone

PVNO is Poly(4-Vinylpyridine-N-Oxide) (Mw 20,000) commercially available from Reilly.

PV/AA is N-vinylpyrrolidone and Acrylic Acid copolymer commercially available under the trade name Sokalan® PG 310.

PVPVI is N-vinylpyrrolidone and N-vinylimidazole co-polymer commercially available under the trade name Sokalan® PG55.

Sarcosinate is Sodium N-Lauroyl Sarcosinate commercially available from Croda under the commercial name of Crodasinic® LS 30.

Dioctyl sodium sulphosuccinate is commercially available from Cytec under the trade name Aerosol OT®.

Disodium lauryl sulphosuccinate is commercially available from Witco under the trade name Rewopol SBF12®.

Disodium lauramido MEA sulphosuccinate is available from Witco under the trade name Rewopol SBC212P®.

PnB is propylene glycol n-butyl ether commercially available from Arco under the trade name Arcosolv® PNB.

BHT is butylated hydroxy toluene.

AMCP is acrylic/maleic based copolymers commercially available under the trade name Sokalan CP5®.

Chelant* is a phosphonate chelant available under the trade name DEQUEST®

Na CnAS is sodium alkyl sulphate.

PA is an ethoxylated tetraethylenepentamine, average molecular weight 12,000.

The compositions exemplified above are preferably packaged in an electrically operated spraying device.

The compositions in the examples above when employed in a process according to the present invention provides a mucous membranes non irritation benefit.

Claims :

1. A process of treating a carpet comprising the application of a liquid composition onto said carpet using an electrical spraying device wherein said composition comprises a nonirritating anionic surfactant rated nonirritant to mucous membranes as measured at a 5% active surfactant solution using the Draize test method.

2. A process of treating a carpet according to claim 1 wherein said nonirritating anionic surfactant is rated nonirritating to mucous membranes as measured at a 10% active surfactant solution using the Draize test method.

3. A process of treating a carpet according to any of the preceding claims wherein said composition comprises up to 50% by weight of the total composition of said nonirritating anionic surfactant.

4. A process of treating a carpet according to any of the preceding claims wherein said non irritant surface active agent is selected from the group consisting of sarcosinate surfactants, sulfosuccinate surfactants, alkyl sulphonate surfactants, alkyl sulphate surfactants, sulfosuccinamate surfactants, sulfosuccinamide surfactants, carboxylate surfactants and mixtures thereof.

5. A process of treating a carpet according to any of the preceding claims wherein said non irritant surfactant is a mixture of a sulfosuccinate surfactant and a second anionic surfactant.

6. A process of treating a carpet according to any of the preceding claims wherein said composition further comprises a peroxygen bleach.

7. A process of treating a carpet according to claim 6 wherein said composition comprises from 0.01% to 20% by weight of the total composition of said peroxygen bleach.

8. A process of treating a carpet according to any of claims 6 or 7 wherein said peroxygen bleach is selected from the group consisting of : hydrogen peroxide; water soluble sources of hydrogen peroxide; organic or inorganic peracids; hydroperoxides; and diacyl peroxides; and mixtures thereof.

9. A process of treating a carpet according to any of the preceding claims wherein said composition further comprises an anti-resoiling agent.

10. A process of treating a carpet according to claim 9 wherein said anti-resoiling agent is a poly (vinyl methyl ether / maleic acid) copolymer, a soil suspending polyamine polymer, a poly vinyl pyridine-N-oxide polymer or a mixture thereof.

11. A process of treating a carpet according to any of the preceding claims wherein said composition further comprises a volatile organic compound.

12. A process of treating a carpet according to claim 11 wherein said volatile organic compound is selected from the group consisting of : an aliphatic and/or aromatic alcohol; a glycol ethers and/or a derivative thereof; a polyol; and a mixture thereof.

13. A process of treating a carpet according to any of the preceding claims wherein said composition further comprises an additional surfactant on top of the nonirritating anionic surfactant.

14. A process of treating a carpet according to any of the preceding claims wherein said composition further comprises a number of additional compounds selected from the group consisting of stabilising agents, chelating agents, builder systems, radical scavengers, perfumes, dyes, suds suppressing agents, enzymes, photobleaching agents, bleach activators and other minors and mixtures thereof.

15. The use of an anionic surfactant rated nonirritating to mucous membranes as measured at a 5% active surfactant solution using the Draize test method in a composition to treat carpets with an electrical spraying device whereby said composition provides a mucous membrane nonirritating benefit when sprayed onto said carpet.

INTERNATIONAL SEARCH REPORT

Int tional Application No
PCT/US 00/15594

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C11D1/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C11D A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 906 950 A (PROCTER & GAMBLE) 7 April 1999 (1999-04-07) page 14, line 47 - line 56; claims 16,18; example III ---	1-4,6-15
P,X	WO 99 51354 A (PROCTER & GAMBLE) 14 October 1999 (1999-10-14) cited in the application abstract page 19, line 25 -page 21, line 5 ---	1-4,9, 13-15
A	US 3 779 929 A (ABLER R ET AL) 18 December 1973 (1973-12-18) abstract column 3, line 7 - line 10; claim 1; example 1 --- -/--	1-4,9, 11,12, 14,15

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 September 2000	11 09. 2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Saunders, T

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/US 00/15594

C.(Continuation) DOCUMENTS CONSIDERED T BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	DE 21 16 147 A (REWO CHEMISCHE FABRIK GMBH) 5 October 1972 (1972-10-05) cited in the application claim 1; example 2 ---	1-5,15
A	GB 2 232 068 A (TEDDER KENNETH SIDNEY) 5 December 1990 (1990-12-05) abstract page 8, paragraph 2 -----	1-4,9,11

1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

..ernational application No.
PCT/US 00/15594

Box I Observations where certain claims were found unsearchable (Continuati n f item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1,2,15 (all in part)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1,2,15 (all in part)

Present claims 1-15 relate to a method defined by reference to a desirable characteristic or property, namely a surfactant rated as non-irritant to mucous membranes, as measured at a 5% solution using the Draize test method. The claims cover all methods having this characteristic or property, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a liminted number of such methods. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search on the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT).

An attempt is made to the define the method by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts which appear to be clear, supported and disclosed, namely methods utilising one of the anionic surfactants listed in claim 4 or the examples.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int tional Application No
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